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(54) HIGH STRENGTH COLD ROLLED STEEL SHEET AND ITS MANUFACTURE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a high strength cold rolled steel sheet having ≥ 780 MPa tensile strength and ≥ 70 MPa amount of baking hardening and combining excellent stretch-flange formability, spot weldability, delayed fracture resistance, and impact resistance.

SOLUTION: A steel stock, having a composition in which 1.5-3.5%, by weight, Mn and 0.005-0.10% Nb are contained and further the amounts of C, Si, P, S, Al, and N are regulated to proper values, respectively, is heated to a temperature at which the amount of Nb unentered into solid solution becomes $\geq 0.003\%$, finish rolled at 950 to 800°C finish rolling delivery-side temperature, coiled at 700 to 400°C coiling temperature, and cold rolled. The resultant steel sheet is annealed at $\geq 800^{\circ}\text{C}$ annealing temperature, rapidly cooled continuously down to $\leq 350^{\circ}\text{C}$ at $(15$ to $150)^{\circ}\text{C/s}$ cooling rate, cooled slowly down to $\leq 200^{\circ}\text{C}$ at $\geq 15^{\circ}\text{C/min}$ cooling rate, and then cooled rapidly down to room temperature. By this procedure, a structure composed essentially of fine bainitic structure of $\leq 2.5\ \mu\text{m}$ average grain size is provided.